

Application No.: 10/524,335
Amendment Dated: January 15, 2008
Reply to Office Action of: October 25, 2007

MAT-8666US

Remarks/Arguments:

The present invention relates to a Power Supply Apparatus. Specifically a plurality of batteries are used for an auxiliary power supply which is tested for abnormalities.

On page 2 of the Office Action, claims 4, 7 and 9 have been rejected under 35 U.S.C. 112. Specifically, the Official Action states that claim 4 recites "the internal capacitance value", which lacks antecedent basis. The Official Action also states that claim 7 and 9 have preambles which are inconsistent with that of their parent claim. Claims 4, 7 and 9 have been amended. Withdrawal of the rejection is respectfully requested.

On pages 3, 4, and 6 of the Office Action, the claims based on Doljack (US Patent No. 7,148,697) have been rejected. Applicants' claim priority based on JP 2003-193426 has a priority date of July 8, 2003. Doljack has a filing date of June 4, 2004. A verified translation of JP 2003-193426 is enclosed. As Applicants' priority date precedes Doljack's filing date, withdrawal of the rejection is respectfully requested.

On page 2 of the Office Action, the Examiner rejects claims 2, 7, 11, 13, 15 and 17 under 35 U.S.C. 103(a) as being unpatentable over Cook (US Patent No. 6,356,086). It is respectfully submitted, however, that the claims are patentable over the art of record for the reasons set forth below.

Cook teaches an apparatus for testing an in-circuit capacitor. Specifically, Cook teaches measuring an equivalent series resistance by applying a current source to the capacitor.

Applicants' invention, as recited by claim 2, includes a feature which is neither disclosed nor suggested by the art of record, namely:

... a microprocessor unit for interrupting charging after a start of charging or interrupting discharging after a start of discharging of the capacitor unit in measuring an internal resistance value of the capacitor unit...

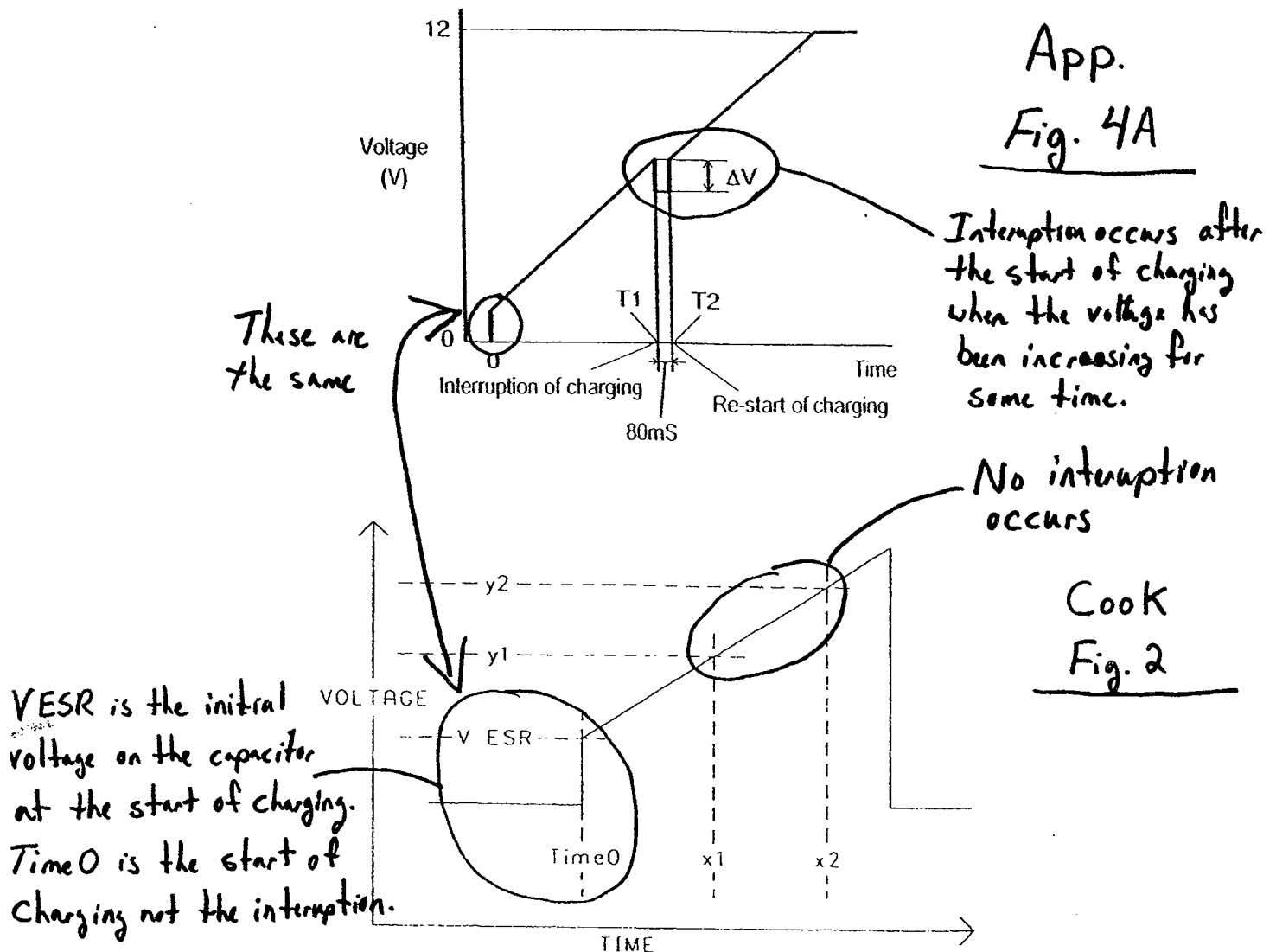
...wherein...the charging is interrupted when a voltage across the capacitor is increasing...

...wherein...the discharging is interrupted when a voltage across the capacitor is decreasing...

Claim 2 relates to interrupting charging or discharging of the capacitor unit. After a certain amount of time discharging or charging is resumed and a voltage difference is measured. This voltage measurement is utilized to determine the internal resistance of the capacitor unit. This feature is found in the originally filed application from page 9, line 20 to page 10, line 5 and furthermore in Figs. 4A and 4B. No new matter has been added.

In col. 3, lines 24-27, Cook teaches measuring the equivalent series resistance (ESR) by observing the voltage across the capacitor when a current source is initially turned on (*"the ESR is first calculated by observing the instantaneous voltage across the capacitor when the current source is first switched to the capacitor"*). Cook is referring to the ESR which is measured at Time 0 as shown in Fig. 2. Specifically, at Time 0, a current source is applied to the capacitor and instantaneous voltage V_{ESR} is measured in order to calculate the internal resistance of the capacitor unit. Applicants' claim 1 is different than Cook, because the addition of measuring the internal resistance value of the capacitor by interrupting charging after a period of time (*"wherein in measuring the internal resistance value of the capacitor unit, the charging is interrupted when a voltage across the capacitor is increasing over a period of time during charging"*). Applicants' interruption of charging for measuring internal resistance is shown in Fig. 4A of the specification. Specifically, at Time 0 charging begins wherein the capacitor may have some initial charge. Then after the voltage across the capacitor is increasing over a period of time charging is interrupted at Time T1. Charging is interrupted for 80 milliseconds and then resumes at Time T2. When charging is resumed, the change in voltage (voltage drop ΔV) is used to determine the internal resistance value of the capacitor. A similar process is shown in applicant's Fig. 4B where discharging of the capacitor is interrupted and voltage rise ΔV is then used to determine the internal resistance of the capacitor unit.

The Office Action on page 3, states that Cook teaches interrupting the charging of the capacitor unit. Applicant's respectfully disagree. Cook teaches measuring the initial voltage at Time 0 when voltage is applied to the capacitor unit. Cook does not teach interrupting charging of the capacitor unit **after Time 0**. Cook's initial voltage at Time 0 VESR as shown in Fig. 2 is similar to Applicant's initial voltage at Time 0 as shown in Fig. 4A. These initial voltages are a result of the initial charge on the capacitor unit (capacitor was not fully discharged). As charging continues, Cook takes readings at Time X1 and X2 in order to calculate the slope of the charge. In contrast, Applicants' interrupt charge between time periods T1 and T2 is shown in Fig. 4A.



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It is because Applicants' include the feature of "a microprocessor unit for interrupting charging **after a start of charging** or interrupting discharging **after a start of discharging** of the capacitor unit in measuring an internal resistance value of the capacitor unit...the charging is interrupted when a voltage across the capacitor is increasing...the discharging is interrupted when a voltage across the capacitor is decreasing", that the following advantages are achieved. An advantage is the ability to measure internal resistance of a capacitor unit at any time during either charging or discharging. Accordingly, for the reasons set forth above, claim 2 is patentable over the art of record.

Claims 4, 7, 9, 11, 13, 15, 16 and 17 include all the features of claim 2 from which they depend. Thus, claims 4, 7, 9, 11, 13, 15, 16 and 17 are also patentable over the art of record for the reasons set forth above.

In view of the amendments and arguments set forth above, the above-identified application is in the condition for allowance which action is respectfully requested.

Respectfully submitted,

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Attachment: Translation of JP2003-193426

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